



## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/006003

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_ which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-16 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. \_\_\_\_\_ as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* 1-7 \_\_\_\_\_ received by this Authority on 06.04.2005 with letter
- nos.\* \_\_\_\_\_ received by this Authority on of 22.03.2005
- ☒ the drawings:
- sheets 1/7-7/7 \_\_\_\_\_ as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (specify): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (specify): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (specify): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (specify): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	<u>1-7</u>	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	<u>1-7</u>	NO
Industrial applicability (IA)	Claims	<u>1-7</u>	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
Reference is made to the following documents:			
<b>D1: WO 03/026240 A (FORSCHUNGSZENTRUM TELEKOMMUNIKATION WIEN BETRIEBS-GHBH) 27 March 2003</b>			
<b>D2: US 2002/196 863 A1 (TAKASHI KAKU, KYOKO HIRAO) 26 December 2002</b>			
<b>D3: US 2002/159 532 A1 (WIGHT) 31 October 2002</b>			
<b>D4: US-B1-6 175 551 (AWATER) 16 January 2001.</b>			
1. According to the description, the invention differs from the disclosure of document D1 only by virtue of the detection of peak values in the cyclic prefix.			
a Document D1 contains the following statements relative to the cyclic prefix:			
<i>"In order to avoid an inter-block interference, a cyclic prefix, the so-called Guard Interval, is used during DMT or OFDM transmission. In this case, the frame end cyclically precedes the block in time. The convolution with the channel pulse</i>			
<i>/...</i>			

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*response then appears as a cyclic convolution, which can be described by a simple multiplication with complex coefficients in the DFT domain" (see D1, page 1, final paragraph).*

*"In figure 1, non-essential components [have been] omitted... Since it is stated that the expansion by the Guard Interval plays no part in the technique according to the invention, this is likewise omitted from figure 1" (see D1, page 7, fourth paragraph).*

- b** It is not altogether clear whether the "Guard Interval plays no role" because it is not taken into account in detecting the peak values or because all the peak values are detected whether or not they are present within the "Guard Interval".

Since the detection of peak values within the cyclic prefix cannot be clearly derived from D1, the subject matter of claim 1 is considered to be novel.

- 2.** However, the subject matter of claim 1 cannot be considered to involve an inventive step.

- a** The description clearly states the following, from which it can be concluded that it is essential to take into account peak values *"in the domain of the cyclic prefix"*.

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citations and explanations supporting such statement

*"The concept upon which the present invention is based is that, for the purposes of crest-factor reduction and of peak-value detection, peak values in the domain of the cyclic prefix are also taken into account" (see description, page 6, lines 19-22).*

**b** Although it is not altogether clear whether the expression *"in the domain of the cyclic prefix"* is the same as *"within the cyclic prefix"* (claim 1), it is nevertheless clear that according to D1 all peak values outside the cyclic prefix are taken into account.

**c** However, the description also states the following:

*"This prefix can nevertheless be arranged - in addition or as an alternative - at the end of a frame or at any other position within a frame" (see description, page 14, lines 34-36).*

*"In principle, any redundancy may be used instead of a cyclic prefix and said redundancy need not necessarily be 'zypisch' [sic]. For example, the corresponding carriers may also be given the value of zero" (see description, page 14, line 36 to page 15, line 3).*

**d** Although in the case of the first statement it is not altogether clear whether the term prefix can

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be used to refer to the end-position, it is nevertheless evident that reference is being made to cyclic extension. In the case of the second statement, it is clear that there need not be any extension at all. It must also be understood that a cyclic extension (or a prefix) is not essential to the invention.

e It is also unclear from the description whether or not the cyclic prefix forms part of the invention. It is not possible to determine what problem the invention is intended to address or how the problem is to be solved. Nevertheless, in this case it appears possible to establish that the subject matter of claim 1 does not involve an inventive step.

f As mentioned above, it is not clear from D1 whether or not peak values within the cyclic prefix are taken into account. The point at issue relates to whether the prefix is inserted before or after the PAR-reduction block (see D1: figure 1). For a person skilled in the art, D1 contains no indication to this effect and a decision must therefore be made independently. In the worst case, a person skilled in the art would test both options and, in this way, arrive at the invention, should this appear advantageous. In consequence, no inventive step can be acknowledged.

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- g** According to D2, peak values within a symbol extension should be taken in to account (see D2, paragraph 54; figure 7, blocks 4 and 22).
- h** According to documents D3 and D4, respectively, peak values within a cyclic prefix are also taken into account (see D3, figure 11, block 100: *"Lightly window the Repeated peak that Appears in the Guard Interval"*; D4, figure 2, blocks 30 and 34).
- 3.** The remaining features defined in the dependent claims can all be found in D1. Thus, the subject matter of claims 2-7 does not involve an inventive step.

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Box No. VIII      Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

4.      Since, according to the description, the cyclic prefix is both essential and non-essential, the technical problem and the solution thereto cannot be understood. The application consequently fails to comply with PCT Rule 5.1 (iii). It has therefore been determined that the description fails to support the claims and, thus, also fails to comply with the requirements of PCT Article 6.